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ABSTRACT

An individualized inservice training program was developed for teachers in Project PLAN (an individualized instruction program in 13 school districts throughout the U.S.). The program consisted of a preservice conference and inservice consultant services designed to encourage specific teaching behaviors. The 17-category Teacher Observation Scale (TOS) was developed for use in measuring behavior changes. It includes five behaviors on which PLAN teachers are expected to spend more time (diagnostic and didactic inquiry, decision facilitation, leading small group discussion, tutoring, giving positive verbal and nonverbal messages) and five on which they are expected to spend less time (solution giving, providing content, giving a negative verbal or nonverbal message, managing records and computer materials, managing learning material and equipment). Materials developed for the 1968-69 training program included modules on use of the computer, classroom organization, and individualization of instruction and video tape models of tutoring and group discussion behavior. Analysis of teacher behavior using TOS with PLAN teachers and a control group led to changes in the second year's training program to place more emphasis on teacher planning, classroom organization, and use of positive reinforcement. Fall 1969 TOS data showed that teacher behavior was moving in the direction of desired change; further examination and modification will be made after analysis of spring 1970 data. (JS)

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THE USE OF THE TEACHER OBSERVATION SCALE IN THE DEVELOPMENT OF THE PLAN TEACHER TRAINING PROGRAM

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In the fall of 1967 a program of individualized education was introduced in thirteen school districts throughout the United States. The program, Project PLAN, was developed by the American Institutes for Research, the Westinghouse Learning Corporation and teachers from the cooperating school districts (Flanagan, 1967). Project PLAN differs from the usual instructional program in its classroom organization, materials, method of instruction, patterns of curriculum, and its definition of the roles of the teacher and the student. Since the project required such comprehensive changes in the schools's program, one of the most important components of the project became the program for teacher development. A Title III ESEA grant (Shanner, et al., 1967) provided the means for designing, writing, implementing, and evaluating a program of teacher development for individualized education using PLAN as the prototype system.

Teacher Training

The definition of teacher behavior implied by the model of instruction in PLAN places high priority on teachers tutoring, counseling, and instructing students in the techniques of managing their own behavior. The actual time teachers spent in these activities during the first year of the project was minimal. The Title III staff developed a teacher training program which provided for the acquisition, improvement and maintenance of behavior most congruent with the PLAN model. This program included a preservice conference and in-service consultant services. The design of the program for teachers was a simulation of the PLAN classroom setting for students in that it provided individualized programs for the teachers organized around

instructional objectives and evaluated by performance criteria which designated the desired teacher behavior in the classroom relative to each objective. The program rationale is described in an earlier paper (Steen, 1969).

Teacher Observation Scale

The PLAN Teacher Observation Scale (TOS) was developed by the Title III Staff to measure the extent to which the teacher training project changed the behavior of the PLAN teacher in the classroom. The seventeen categories were identified to include the best description of events occurring in PLAN classrooms, events we would want to occur in PLAN classrooms and events that account for the desirable model of teacher activities (Quirk, 1969).

Of the seventeen categories on the TOS it was anticipated that PLAN teachers would spend more time than non-PLAN teachers in diagnostic and didactic inquiry, decision facilitating, leading small group discussions, tutoring and giving positive verbal or non-verbal messages.

It was anticipated that PLAN teachers would spend less time than non-PLAN teachers in the following categories: solution giving, providing content, giving negative verbal or non-verbal messages, managing records and computer materials, managing learning materials and equipment and managing student activities. The remaining five categories were unclassified at this time although it was anticipated that possible future hypotheses related to these categories would be suggested by the data. These categories are outlined in Figure 1.

Relationship of the Teacher Training Program to the Teacher Observation Scale

One purpose of the 1968 Teacher Training Program was to train teachers to spend a greater percentage of time demonstrating behaviors categorized on the TOS as desirable for the role of the teacher in PLAN. The activities in the training program contributing to these categories are discussed below.

A large percentage of the teacher training material was designed around sets of instructional objectives and their related learning activities. These were called modules. A module on the computer and a module on classroom organization were written to teach the use of the PLAN organization to handle many of the functions for which teachers had been responsible in the past. The objective of training in these two areas was to reduce the percentage of teacher time required in managing student records, and managing student learning materials.

A module on individualizing the student's education program was designed to teach the skills needed for teachers to counsel students in techniques of managing their own time and behavior. The use of positive reinforcement was stressed in all materials. It was predicted that this material would result in increased teacher time in decision facilitating, the use of positive verbal message and a decrease in time spent in managing student activities.

Video tapes were made on the topics of tutoring and group discussion. The tapes provided a model for the teacher to emulate in a practice session after viewing the taped model. The amount of practice the teacher

wished to employ after viewing the model tape was left to the discretion of the teacher. These tapes and the accompanying written materials were designed to increase the percentage of time teachers would spend in diagnostic and didactic inquiry, in modeling the role of discussion leader and in individual and small group tutoring.

TOS Data From 1968-69

The hypotheses for the 1968 teacher training program were that the PLAN teachers would spend significantly more time than Control teachers in diagnostic and didactic inquiry, in decision facilitating, in giving positive messages for purposes of behavior modification and in total individual instruction. It was further hypothesized that Control teachers would spend significantly more time than PLAN teachers in providing content within group discussion, in giving negative messages within behavior modification and in managing learning materials and students' activities.

PLAN teachers did spend significantly more time than Control at primary, intermediate and secondary levels in diagnostic and didactic inquiry. This would lend support to the training materials on tutoring. There were no significant differences, however, between PLAN and Control teachers in decision facilitating, providing content within group discussion, or in giving negative messages within behavior modification.

There was a surprising result that PLAN teachers at the secondary level spent less time than Control teachers in giving positive messages within behavior modification. The results were in the predicted

direction, however, at the primary and intermediate levels. Nevertheless, this indicated a very significant weakness in the training program as it related to individualizing the students' educational program.

Perhaps the most important information which was contrary to predictions was that PLAN teachers at every level spent more time than Control teachers in managing learning materials and in managing student activities. The materials on computer and classroom organization evidently had not been adequate. There were, of course, several factors during the first year and a large part of the second year which contributed to these negative results. We believe the major factor was that the computer did not operate in a way to make it possible for the system to be fully implemented until the end of the second year.

Modifications of the Teacher Training Program for 1969-70

The discrepancies between our predictions and the actual teacher behaviors were in the categories of decision facilitating, giving positive verbal and non-verbal message, managing learning materials and managing student activities. With information about these discrepancies, teacher opinion surveys, and observations of PLAN consultants working with the teachers the conclusion was reached that there was a need for more emphasis on teacher planning, classroom organization and the use of positive reinforcement.

A comprehensive module on classroom organization was written which required teachers to use the computer to monitor their own progress

through the teacher training modules. The purpose of this was to have teachers experience the techniques that they would train students to use. Emphasis was placed on using computer results to plan teacher and student time and to encourage the student to use the computer independently of the teacher.

Material on behavior modification techniques using positive reinforcement was revised from a programmed booklet to a module using hypothetical models with teachers developing sample planning strategies for the hypothetical models.

The material on group discussion was omitted. It was felt that the increased emphasis on small group tutoring would take care of the kinds of activities that we had attempted to teach in the module on group discussion. To this end the video tapes from the minicourse in tutoring developed by the Far West Laboratory in Berkeley (Langer, 1969) were used and supplemented by some written materials prepared by the PLAN staff.

Teachers new to PLAN during 1969-70 school year were trained using this revised program. In October of 1969 TOS measures were taken in their classrooms, the classroom of returning PLAN teachers and all Control classrooms. The same procedures were used as in the spring of 1969 (Quirk, 1969). Another set of data will be collected in April and May of 1970 after the consultant in-service program has been fully implemented. The October data were gathered after slightly more than one month of consultant in-service support so it can be assumed that the latter did not greatly influence the fall data and that the data are largely reflective only of the effectiveness of the summer teacher

training program. No attempt has been made at this time to compare 1969-70 PLAN teachers with 1969-70 Control teachers. The PLAN and Control comparisons for fall 1969-70 are now being completed and will be reported at a later date.

Fall 1969 Observations

New Versus Returning PLAN Teachers

The category of group discussion was changed in the 1969 version of the TOS to discriminate between small group instruction and large group instruction. Small group was defined as less than one-half of the class. There were no other modifications in the scale.

Teachers new to PLAN in 1969 were compared with teachers returning to PLAN classes in the western developmental schools. This was a total of 91 teachers at grades 1, 2, 3, 5, 6, 7, 9, 10, and 11. Fifty of the teachers were new to PLAN in the fall of 1969 and 41 of the PLAN teachers were returning. The returning teachers did not participate in the 1969 summer training training program. However, they did have the benefit of continuing consultant services.

These comparisons between new and returning PLAN teachers are presented in Tables 1-4. Table 3, intermediate level teachers, includes only levels 5 and 6 and not level 7 because all the latter except one were new teachers. Also some level 7 classes were organized in junior high schools rather than in elementary schools. Level 7 teachers were included in the combined analyses presented in Table 1.

New primary teachers at levels 1, 2, and 3 combined spent signifi-

cantly less time giving negative verbal and non-verbal messages to female students than did returning teachers (See Table 2). There was no significant difference with male students or with all students combined.

Returning secondary PLAN teachers, levels 9, 10, and 11 combined, used positive verbal and non-verbal reinforcement with male students more frequently than new teachers (See Table 4). This result must be interpreted cautiously because the large number of tied scores at zero greatly inflate the Z value of the U. With all levels combined the returning teachers used more positive reinforcement and more total behavior modification techniques than new teachers.

An area of great interest from the fall, 1969 data is that of managing student behavior. New primary teachers spent significantly less time managing student activities than returning PLAN teachers. This was significant at the .01 level (See Table 2). There were no significant differences at intermediate and secondary levels although both were in the predicted direction. Far all levels combined (Table 1) the results were significant at the .01 level.

Returning primary teachers spent more time facilitating decisions with female students than the new PLAN teachers (See Table 1). Since ties were large, the Z value was inflated and should be interpreted cautiously. There were no other significant differences at any level in this category.

Returning primary teachers spent more time extending concepts and interests with male students than new PLAN teachers (Table 2). Again, a large number of tied scores at zero inflated the Z value. This difference was also significant at the .05 level with all levels combined

(Table 1).

Discussion

The decrease in the time new PLAN primary teachers spent managing student activities could be attributed to the almost double emphasis in the written teacher training materials on this topic. The new teachers at all levels spent less time than returning teachers managing learning materials. Even though the results were in the predicted directions none were statistically significant. Since one of the major goals of PLAN is to increase student managed behavior, these changes are seen as highly desirable.

Material on extending concepts and interests was part of the 1968 summer training. This material was dropped in 1969 and the Far East Laboratory Minicourses on tutoring were introduced in October instead of during summer (Langer, 1969). Since the data reported in this paper were gathered in October, it is fair to conclude that teacher training in tutoring could not have influenced the classroom behavior of the teachers at the time they were observed.

The trend in the behavior modification categories indicates a decrease in the use of negative reinforcement but does not support the anticipated increase in the use of positive reinforcement. There are two factors to consider here. Without the PLAN control comparisons we don't know the extent to which the returning teachers have improved in the use of positive reinforcement. This will necessarily await the analyses of the PLAN Control Data. Hall's Study (Hall, et. al., 1968)

on the teacher's effective use of reinforcement emphasized the fact that teachers must use the technique in a consistent manner. In his study the observers stayed in the classroom and cued the teachers when to use the appropriate reinforcement. In PLAN the returning teachers received regular support from the PLAN consultant. Although it was not as frequent as in the Hall study, one could predict that the consultant help will influence the consistent use of reinforcement techniques by the PLAN teachers. The comparison of spring TOS data and fall TOS data will provide more information relative to the extent to which the in-service program of consultant help increases the degree to which teachers use the behavior modification techniques.

The analyses reported in this paper center on the initial effects of the summer training conference. It may be that more difficult behavior changes such as the use of behavior modification techniques take longer to acquire and modify. There is some empirical evidence that mastery of the managerial, organizational skills is basic to freeing the teacher to concentrate on the more complex levels of personal interactions. Such questions will be explored with the spring 1970 data collection and subsequent analyses.

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Table 1

Comparison of PLAN Teachers: New Teachers vs. Returning Teachers

(All levels: 1, 2, 3, 5, 6, 7, 9, 10 and 11 combined)

Category	Teacher Observation Scale								
	Female Students			Male Students			Whole Class		
	New PLAN Teachers (N = 50)	Returning PLAN Teachers (N = 41)	Mann Whitney	New PLAN Teachers (N = 50)	Returning PLAN Teachers (N = 41)	Mann Whitney	New PLAN Teachers (N = 50)	Returning PLAN Teachers (N = 41)	Mann Whitney
	Percent	Percent	U	Percent	Percent	U	Percent	Percent	U
Individual Instruction									
1. Diag. & didac. inq.	4.8	4.7		4.9	5.7		9.7	10.4	
2. Decision facilitat.	.2	.2		.2	.2		.4	.4	
3. Solution giving	9.6	8.8		10.8	11.1		20.4	20.0	
4. Ext. conc. & int.	.2	.2		.1	.2	809*	.3	.4	778*
5. Silent attending	5.9	5.0		7.8	7.6		13.7	12.6	
Small Group Discussion									
6. Mod. discus. lead.	--	--		--	--		0.0	.2	
7. Lead. group discus.	--	--		--	--		2.0	1.5	
8. Tutoring	--	--		--	--		3.8	3.3	
9. Providing content	--	--		--	--		.9	1.8	
10. Silent attending	--	--		--	--		3.0	3.1	
Large Group Discussion									
11. Lead. group discus.	--	--		--	--		.6	.1	
12. Tutoring	--	--		--	--		1.0	.4	
13. Providing content	--	--		--	--		1.2	.1	862*
14. Silent attending	--	--		--	--		1.4	.2	
Behavior Modification									
15. Positive message	.2	.4		.3	.5	724*	.6	.9	770*
16. Negative message	.2	.3		.7	.9		1.1	1.5	
Systems Management									
17. Man. comp. mat.	--	--		--	--		3.1	2.6	
18. Man. learn. mat.	--	--		--	--		9.1	10.0	
19. Man. stud. act.	--	--		--	--		11.0	14.6	602**
20. Obs., list., walk.	--	--		--	--		14.6	14.1	
Other									
21. Act. unrel. to inst.	--	--		--	--		2.1	1.8	
Individual (1+2+3+4+5)	20.6	18.9		23.9	24.9		44.6	43.8	
Small Group (6+7+8+9+10)	--	--		--	--		9.7	9.9	
Large Group (11+12+13+14)	--	--		--	--		4.2	.7	840*
Behavior Modif. (15+16)	.4	.7	773*	1.0	1.4	770*	1.7	2.4	747*
Systems Management (17+18+19+20)	--	--		--	--		37.7	41.4	

*p < .05
**p < .01

Table 2

Comparison of PLAN Teachers: New Primary Teachers vs. Returning Primary Teachers
(Levels 1, 2, and 3 combined)

Category	Teacher Observation Scale								
	Female Students			Male Students			Whole Class		
	New Primary PLAN Teachers (N = 17)	Returning Primary PLAN Teachers (N = 19)	Mann Whitney	New Primary PLAN Teachers (N = 17)	Returning Primary PLAN Teachers (N = 19)	Mann Whitney	New Primary PLAN Teachers (N = 17)	Returning Primary PLAN Teachers (N = 19)	Mann Whitney
	Percent	Percent	U	Percent	Percent	U	Percent	Percent	U
Individual Instruction									
1. Diag. & didac. inq.	3.6	3.9		5.0	6.1		8.5	10.0	
2. Decision facilitat.	.0	.2	102**	.1	.2		.1	.3	
3. Solution giving	9.3	8.9		9.2	9.9		18.5	19.0	
4. Ext. conc. & int.	.1	.1		0.0	.2	118*	.1	.2	
5. Silent attending	5.3	4.7		8.6	7.4		13.9	12.1	
Small Group Discussion									
6. Mod. discus. lead.	--	--		--	--		.1	.4	
7. Lead. group discus.	--	--		--	--		1.4	2.0	
8. Tutoring	--	--		--	--		4.1	3.8	
9. Providing content	--	--		--	--		1.5	1.7	
10. Silent attending	--	--		--	--		3.3	2.9	
Large Group Discussion									
11. Lead. group discus.	--	--		--	--		1.2	.2	
12. Tutoring	--	--		--	--		1.4	.7	
13. Providing content	--	--		--	--		1.2	.1	
14. Silent attending	--	--		--	--		1.8	.4	
Behavior Modification									
15. Positive message	.4	.5		.6	.9		1.2	1.4	
16. Negative message	.3	.5	101*	.8	1.1		1.5	2.0	
Systems Management									
17. Man. comp. mat.	--	--		--	--		2.5	1.0	
18. Man. learn. mat.	--	--		--	--		10.3	10.4	
19. Man. stud. act.	--	--		--	--		11.8	17.5	58**
20. Obs., list., walk.	--	--		--	--		14.7	12.6	
Other									
21. Act. unrel. to inst.	--	--		--	--		.9	1.3	
Individual (1+2+3+4+5)	18.2	17.8		22.9	23.8		14.1	41.6	
Small Group (6+7+8+9+10)	--	--		--	--		10.4	10.9	
Large Group (11+12+13+14)	--	--		--	--		5.6	1.4	
Behavior Modif. (15+16)	.7	1.0		1.5	2.0		2.6	3.4	90*
Systems Management (17+18+19+20)	--	--		--	--		39.4	41.5	

*p < .05
**p < .01

Table 3

Comparison of PLAN Teachers: New Intermediate Teachers vs. Returning Intermediate Teachers
(Levels 5 and 6 combined)

Category	Teacher Observation Scale								
	Female Students			Male Students			Whole Class		
	New Intermediate Level PLAN Teachers (N = 11)	Returning Intermediate Level PLAN Teachers (N = 14)	Mann Whitney	New Intermediate Level PLAN Teachers (N = 11)	Returning Intermediate Level PLAN Teachers (N = 14)	Mann Whitney	New Intermediate Level PLAN Teachers (N = 11)	Returning Intermediate Level PLAN Teachers (N = 14)	Mann Whitney
	Percent	Percent	U	Percent	Percent	U	Percent	Percent	U
Individual Instruction									
1. Diag. & didac. inq.	4.4	5.8		3.8	6.0		8.2	11.8	
2. Decision facilitat.	.5	.2		.5	.2		1.1	.4	
3. Solution giving	9.9	8.0		9.6	11.1		19.7	19.1	
4. Ext. conc. & int.	.1	.2		.2	.3		.3	.5	
5. Silent attending	6.4	5.9		6.5	7.9		12.9	13.8	
Small Group Discussion									
6. Mod. discus. lead.	--	--		--	--		.1	0.0	
7. Lead. group discus.	--	--		--	--		3.6	1.7	
8. Tutoring	--	--		--	--		4.9	3.9	
9. Providing content	--	--		--	--		1.2	1.8	
10. Silent attending	--	--		--	--		3.9	4.1	
Large Group Discussion									
11. Lead. group discus.	--	--		--	--		.6	0.0	
12. Tutoring	--	--		--	--		0.0	0.0	
13. Providing content	--	--		--	--		.4	0.0	
14. Silent attending	--	--		--	--		.2	0.0	
Behavior Modification									
15. Positive message	.2	.3		.1	.3		.3	.7	
16. Negative message	.2	.3		.7	.7		1.1	1.3	
Systems Management									
17. Man. comp. mat.	--	--		--	--		4.2	3.5	
18. Man. learn. mat.	--	--		--	--		9.0	10.1	
19. Man. stud. act.	--	--		--	--		10.7	11.9	
20. Obs., list., walk.	--	--		--	--		15.1	13.7	
Other									
21. Act. unrel. to inst.	--	--		--	--		2.7	1.8	
Individual (1+2+3+4+5)	21.3	20.1		20.6	25.5		42.1	45.6	
Small Group (6+7+8+9+10)	--	--		--	--		13.6	11.5	
Large Group (11+12+13+14)	--	--		--	--		1.3	0.0	
Behavior Modif. (15+16)	.4	.6		.9	.9		1.4	1.9	
Systems Management (17+18+19+20)	--	--		--	--		39.0	39.1	

*p < .05
**p < .01

Table 4

Comparison of PLAN Teachers: New Secondary Teachers vs. Returning Secondary Teachers

(Levels 9, 10 and 11 combined)

Category	Teacher Observation Scale								
	Female Students			Male Students			Whole Class		
	New Secondary PLAN Teachers (N = 9)	Returning Secondary PLAN Teachers (N = 7)	Mann Whitney	New Secondary PLAN Teachers (N = 9)	Returning Secondary PLAN Teachers (N = 7)	Mann Whitney	New Secondary PLAN Teachers (N = 9)	Returning Secondary PLAN Teachers (N = 7)	Mann Whitney
	Percent	Percent	U	Percent	Percent	U	Percent	Percent	U
Individual Instruction									
1. Diag. & didac. inq.	6.3	4.9		5.9	4.2		12.2	9.0	
2. Decision facilitat.	.2	.3		.3	.3		.5	.6	
3. Solution giving	9.1	8.9		16.3	13.5		25.6	22.3	
4. Ext. conc. & int.	1.0	.5		0.0	.2		1.0	.6	
5. Silent attending	5.7	3.9		8.4	7.4		14.1	11.3	
Small Group Discussion									
6. Mod. discus. lead.	--	--		--	--		0.0	0.0	
7. Lead. group discus.	--	--		--	--		3.2	.2	
8. Tutoring	--	--		--	--		.8	1.4	
9. Providing content	--	--		--	--		.2	2.0	
10. Silent attending	--	--		--	--		2.6	1.8	
Large Group Discussion									
11. Lead. group discus.	--	--		--	--		.1	.2	
12. Tutoring	--	--		--	--		0.0	.3	
13. Providing content	--	--		--	--		.5	0.0	
14. Silent attending	--	--		--	--		.1	0.0	
Behavior Modification									
15. Positive message	0.0	0.0		0.0	.2	12*	.1	.2	
16. Negative message	0.0	0.0		.6	.5		.7	.7	
Systems Management									
17. Man. comp. mat.	--	--		--	--		2.4	5.3	
18. Man. learn. mat.	--	--		--	--		8.4	9.1	
19. Man. stud. act.	--	--		--	--		11.7	12.9	
20. Obs., list., walk.	--	--		--	--		13.5	18.6	
Other									
21. Act. unrel. to inst.	--	--		--	--		2.1	3.4	
Individual (1+2+3+4+5)	22.3	18.3		30.9	25.6		53.4	43.9	
Small Group (6+7+8+9+10)	--	--		--	--		6.9	5.4	
Large Group (11+12+13+14)	--	--		--	--		.7	.5	
Behavior Modif. (15+16)	.1	0.0		.7	.7		.8	.9	
Systems Management (17+18+19+20)	--	--		--	--		36.0	46.0	

*p < .05
**p < .01

Figure 1

Teacher Observation Scale

Expected High and Low Behavior Categories for PLAN Teachers

High	Low	Unclassified
1) Diagnostic and didactic inquiry	3) Solution giving	4) Extending concepts and interests
2) Decision facilitating	13) Providing content	5 & 10) Silent attending; Individual
7) Leading small group discussion	16) Giving a negative verbal or non-verbal message	14) Silent attending group
8) Tutoring	17) Managing records and computer material	20) Observing listening and walking
15) Giving positive verbal or non-verbal message	18) Managing learning material and equipment	21) Activities unrelated to instruction